

GAO

Report to the Chairman, Committee on  
Armed Services, House of  
Representatives

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July 1993

INDUSTRIAL BASE

Impact of Defense  
Downsizing on  
Selected Abrams Tank  
Subcontractors



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**National Security and  
International Affairs Division**

B-253696

July 15, 1993

The Honorable Ronald V. Dellums  
Chairman, Committee on  
Armed Services  
House of Representatives

Dear Mr. Chairman:

In response to a request from the former Chairman, we compiled some information on (1) the effect of declining defense budgets on some second- and third-tier defense suppliers<sup>1</sup> and (2) the willingness or ability of companies that shift from defense to commercial work to shift back to defense production when required. The number of such suppliers is very large, and the time and effort to obtain data on each company would be substantial. Therefore, as agreed with your staff, we obtained the information in this report, without verification, through a series of structured interviews with 14 of the second- and third-tier contractors considered critical to the production of the Abrams M1A1 tank. Since little is known about defense contractors below the second-tier level or of the financial health of firms that comprise the defense industrial base below the prime contractor level, our work provides some perspectives on how companies supplying critical tank components at lower tiers are adjusting to defense downsizing. Appendix I contains more details on our scope and methodology.

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**Results in Brief**

The reduction in defense spending has reduced the business and employment levels of most of the companies we contacted. As of May 1993, 11 of the 14 tank contractors we queried had lost sales and/or released employees as a result of defense cutbacks, while others had not been affected. To date, a mix of the completion of Abrams tank production and spare part sales, foreign military sales, and/or commercial and other defense sales has kept these 14 contractors in business. However, 8 of the 14 contractors were either unsure or could not comment about the extent to which they could retain their current tank component production capabilities.

Factors cited by the contractors as affecting their ability to reconstitute Abrams tank production included whether they had comparable

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<sup>1</sup>Subcontractors manufacture specialized parts, components, or subsystems that are integrated into a larger subsystem or final system. In a major weapon system, several layers of subcontractors might produce hundreds or thousands of individual items.

commercial business and whether they produced the tank component using the same facilities, equipment, and/or personnel as were used in commercial production. The contractors reported that the time they would need to reconstitute production for tank components ranged from 6 months to 5 years. Generally, contractors that had comparable commercial business reported less time to reconstitute than contractors that did not have such business. Impediments to reconstitution included obtaining critical skills, vendors, materials, test equipment, and production facilities along with meeting government requirements and specifications.

## Background

As the defense industry downsizes in response to decreased military spending, questions arise as to the viability of the U.S. defense industrial base and its ability to respond to future defense needs should they arise. The defense technology and industrial base is the combination of people, institutions, technological know-how, and facilities used to design, develop, manufacture, and maintain the weapons and supporting defense equipment needed to meet U.S. national security objectives. This base has three broad components: research and development, production, and maintenance and repair, each of which includes public and private sector employees and facilities. It can also be divided into several tiers: prime contractors, major subcontractors, and lower tiers that include suppliers of parts and raw materials. The Department of Defense (DOD) does not systematically maintain data on firms at lower production tiers, even those that provide important specialized technology. Therefore, DOD has little knowledge about these firms or the financial health of the defense industrial base at the lower tiers.

The Fiscal Year 1993 National Defense Authorization Act authorizes \$225 million for the remanufacture of Abrams M1 tanks to the M1A2 configuration. The House Armed Services Committee report on the act states that a tank upgrade program is a prime example of how upgrades can preserve critical components of the U.S. defense production base at minimum risk and at minimum cost while providing needed improvements in our fielded systems. According to the Office of the Secretary of Defense (OSD), the M1-M1A2 Abrams Tank Conversion Program is expected to help sustain the tank industrial base. OSD indicated that the conversion program would use some critical portions of the tank industrial base should foreign military sales fail to materialize in the future, assuming spare parts production continues and vendors who cannot produce at lower production rates are replaced. Unique elements of the tank base that would be used include electronics; special armor; cannon; gun mount;

nuclear, biological, and chemical protection; turret weld; and fabrication elements. OSD also noted that, unlike foreign military sales, the conversion program would allow continuation of the special depleted armor facility operated by the Department of Energy. Not all elements of the base, however, will be used by the conversion program.

The 14 contractors in our review are diverse. Some were Fortune 500 companies while others were smaller, privately owned businesses. The following further describes these companies' diversity.

- Only 3 of the 14 contractors manufacture defense products exclusively: one produces a component for the Abrams tank gun turret; another produces power control modules and multilayered circuit boards; and the third produces hydraulic components. The remaining 11 contractors manufacture products for both military and commercial applications, including steel plate, fuel and movement/position sensors, transmissions, turbine engines, relief valves, pumps, fuel control and handling units, and circuit boards.
- Of the 14 contractors, 3 were in the aerospace industry; 6 in the automotive industry; 3 in the electrical industry; and 2 in the steel industry.
- The 14 contractors differed in size and type. Six are privately owned companies with employment levels ranging from 30 to 1,477 people. The remaining 8 contractors employ from 95 to 4,720 people and are subsidiaries of corporations—6 are subsidiaries of Fortune 500 companies.
- The 14 contractors varied in the amount of time they have been in the defense industry. For example, 1 of the 14 companies has been in the defense business for as long as 66 years, while another only recently began defense production. One contractor started to produce high performance pumps for military aircraft in the late 1920s. Another contractor did not start to produce circuit boards for the defense market until 1990 in order to utilize some of its excess plant capacity.

## Impact of the Defense Downsizing on Selected Second- and Third-Tier Contractors

As of May 1993, many of the contractors indicated that they had lost sales and/or released employees as a result of defense cutbacks, while others had not been affected. Of the 14 suppliers we interviewed, 11 said they had been adversely affected by declines in defense spending. Of the remaining three contractors, one said it had not experienced any major impact from decreases in defense spending, a second said that its defense business had increased, and information on the third was not available.

Of the 11 contractors adversely affected by decreased defense spending, 3 said efforts are underway to offset losses experienced in defense production. These companies' representatives said that to counter defense downturns, they are either actively seeking new applications of both military and commercial product lines, increasing the proportion of their commercial business, and/or investing in new products.

All 14 companies remained in business as of May 1993. A combination of the completion of current Abrams tank production and spare parts sales, foreign military sales, and/or commercial and other U.S. defense sales helped these companies maintain their business base. Table 1 shows the impact of defense cutbacks reported by these companies.

**Table 1: Reported Impact of Declining Defense Spending on 14 Contractors**

Company	Industry sector	Reported impact
A	Aerospace	\$30 million in defense contracts cancelled or pushed into the future.
B	Automotive	Significant layoffs; early retirements encouraged.
C	Automotive	Production at one plant shut down.
D	Automotive	New defense production dropped by 65 percent; number of employees reduced by 30 percent.
E	Aerospace	Declines in defense production offset by diversification into commercial markets.
F	Steel	Total defense sales dropped nearly \$25 million; number of employees decreased 12 percent; looking for ways to offset defense declines.
G	Aerospace	Declines in defense production were offset by finding new applications for commercial and military lines, increasing commercial business, and investing in new programs.
H	Steel	No major impact.
I	Electrical	Not available.
J	Electrical	Defense sales increased.
K	Electrical	Defense sales fluctuated significantly.
L	Automotive	Production facility downsized.
M	Automotive	Annual defense sales went down 40 percent.
N	Automotive	Number of employees dropped.

Six of the 14 firms said that their tank production capabilities should be sufficient to maintain production over the next few years if proposed sales to foreign military customers, sales of spare parts to the U.S. military, and

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expected Abrams tank upgrades materialize. Of the remaining eight contractors, seven were either unsure or did not comment about the extent to which anticipated sales would help maintain their tank production capabilities. The last firm indicated that its future is uncertain, but it was hopeful that sales would help it retain its critical tank component production capabilities.

While the majority of the companies we contacted were uncertain of their future role in tank production, many were not heavily dependent on the tank program. Six of the 14 companies derived less than half their total sales from defense production, with tank production representing no more than 5 percent for 5 of these companies' annual sales. The remaining eight companies derived more than half of their business from defense production. Of these eight companies, four were dependent on the tank program for more than 40 percent of their total business. All eight of these companies were dependent on other defense programs as well as the tank.

Some company representatives were able to identify the number of tank component units they needed to produce per year in order to maintain tank production capabilities. For example, one company said that it had to produce at least 70 units per year to sustain its Abrams production. Another company reported needing as many as 204 units per year to justify continuing production of the item. Many contractors could not speculate as to the annual Abrams production quantities necessary to sustain Abrams production.

The companies identified the number of their suppliers they considered critical. The definition of a critical supplier varied, and the number of critical suppliers ranged from none to as many as 150. Several contractors defined critical suppliers as those who manufacture unique military components. Other contractors defined a supplier as critical if it was the only source for the component. Yet other contractors defined a critical supplier by its ability to produce parts that meet unique military standards. Some of the companies reported that some of their critical suppliers had left the business, but they had either found substitute suppliers or moved production in-house. This suggests that at least among the companies we contacted, there are alternatives to firms believed to be critical. Only 1 of the 14 contractors relied on some foreign suppliers for critical resources used in the production of Abrams tank components.

## Reconstitution Will Require Time and Overcoming Some Impediments

The 14 companies reported time to reconstitute tank production varying from 6 months to 5 years. One contractor, totally dependent on defense business, stated that it would not reconstitute the Abrams portion of its business should such production cease. Another contractor, completely dependent on defense, said that if it were closed for more than 3 months, it would be out of business and would not be able to reassemble the managers and employees capable of producing the component it builds if it tried to reenter the business.

A factor in the ability to reconstitute was whether the company had comparable commercial business and produced the tank component using the same facilities, equipment, and/or personnel used in commercial production. Representatives at 9 of the 11 companies that have both commercial and defense business stated that dual use is possible because they produce products that require similar employee training and work skills, have similar military and commercial quality requirements, and/or have similar commercial and defense applications. At eight of these nine companies, representatives said that they could reconstitute their tank component production within about 12 to 18 months of a shutdown lasting less than a year assuming their commercial and other defense business remained viable.

Defense business for six of these nine dual use companies was 50 percent or less of their total business. Officials from these six companies said that if they were to reconstitute the tank component production, they might need to purchase new test equipment; invest in component redesign; restore dies to a useable condition; and/or replace lost vendors, skills, and technology.

Each of the 14 contractors cited impediments to reconstituting production. The following summarizes contractors' views on impediments to reconstitution:

- Ten of the 14 contractors cited the loss of employee skills and/or experience as an impediment to reconstitution in that several processes related to Abrams production are either highly specialized and/or require unique skills. In some cases, according to company officials, formal training and/or on-the-job experience would be required before an employee could produce Abrams components. Although commercial and defense workers are used interchangeably at some of these companies, obtaining qualified new employees is still an impediment due to steep learning curves.

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- Five contractors cited the loss of available suppliers, machine shops, equipment, and/or tooling as an impediment to reconstitution. One firm said that if a shutdown lasted over 1 year, machines and tooling would probably be disposed of and that replacing these assets would take considerable time and money. Other contractors said that time would be needed to obtain machining and other suppliers. Requalifying new suppliers could be an impediment since old suppliers might not be available after a shutdown.
  - Six contractors said that if test equipment was disposed of, replacement of this unique equipment would be very expensive and time-consuming. Moreover, one contractor said that significant expenditures would be required if environmental testing facilities closed due to a lapse in work. These facilities perform tests on components under various conditions, such as extreme heat or fog. Others noted that unless the equipment is maintained and kept calibrated, it would require recalibration, refurbishment, or replacement before it could be used.
  - Four contractors identified technological changes as an impediment to reconstitution. Two contractors noted that the technology used to produce Abrams components is highly complex and changes frequently.
  - Eight of the contractors said that following a shutdown, time would be required to test and recertify parts, people, and some equipment to meet government requirements. These requirements include specialized employee and part certifications and first article and/or initial production tests. One contractor said registration for certification courses must now be made 3 to 6 months in advance. Another contractor said that government specifications for the component it produces might change after a shutdown. This might require investment of time and component redesign and test specifications prior to restarting production.
  - One contractor said that material lead times would affect how quickly it could reconstitute production. Moreover, this contractor said time would be needed to perform a business case evaluation to determine whether or not it was economically feasible to return to production.
  - Seven of the 14 firms said that the lack of government ownership of some technical proprietary data might affect the ability of other contractors to produce the tank component if the original vendor closed and chose not to share such data. However, Army officials and the prime contractor believed the lack of ownership of the proprietary data would probably not affect their ability to find an alternative supplier to produce any given component for the tank.

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We are sending copies of this report to the Secretary of Defense and to other interested congressional committees. Copies of the report will also be made available to others upon request.

Please contact me at (202) 512-7683 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix II.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Paul F. Math". The signature is stylized and cursive.

Paul F. Math  
Director, Acquisition, Procurement,  
Technology, and Competitiveness



# Objectives, Scope, and Methodology

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To obtain some perspectives on how companies supplying critical tank components at lower tiers were adjusting to the defense downsizing, we obtained information from 14 contractors at the second- and third-tier levels.

We relied on General Dynamics Land Systems Division, the prime contractor for the Abrams tank, to identify its critical second-tier suppliers. Company representatives identified 129 second-tier suppliers that provide critical components or have critical skills and/or technologies. We also relied on the Army to identify its contractors who provide equipment directly to the Army rather than to the prime contractor. Military officials identified 19 second-tier suppliers to the Army. Using this contractor and Army-furnished contractor data, we selected seven second-tier suppliers —five contractors that supply General Dynamics Land Systems Division and two that supply the Army. We interviewed representatives of each of the seven second-tier suppliers using a structured interview and asked them to identify third-tier suppliers they considered critical to their Abrams production. We then selected and interviewed 7 critical third-tier suppliers, using the same structured interview, for a total of 14. We judgmentally selected all 14 companies based on their representation of different industry sectors at the second- and third-tier levels.

We did not attempt to define the entire base, verify the contractor-furnished information, or validate the contractor's definition of its critical suppliers. To ensure that we accurately described the information provided by the companies, we provided them with a summary of the information they provided, asked for their comments, and incorporated their comments when appropriate.

Because this report contains the results of discussions with contractors rather than DOD, we did not seek agency comments. However, we discussed the matters in this report with DOD officials and included their views where appropriate. We conducted our work from October 1992 to May 1993.

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